Expanding PIER Partnerships: New Concepts for Development and Demonstration

Task 2 – National Guard Audit and Recommendations
California Lighting Technology Center’s mission is to stimulate the development and application of energy-efficient lighting by conducting technology development and demonstrations, outreach and educational activities, in partnership with lighting manufacturers, lighting professionals, the electric utility community, and governmental agencies. CLTC was established as a collaborative effort between the California Energy Commission and UC Davis, with support by the U.S. Department of Energy and the National Electrical Manufacturers Association (NEMA).
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1.0 INTRODUCTION

The purpose of this contract was to help develop and expand Public Interested Energy Research (PIER) partnerships. The task related to this report was the expanded development and support of an energy efficiency lighting partnership between PIER and the California National Guard (CNG). Project goals focused on identification and development of a portfolio of standardized lighting retrofit measures which could be replicated at other CNG facilities. This report documents a basic framework of typical lighting applications and technologies, which are expected to be found at facilities throughout the CNG. Baseline and retrofit technologies are based on audits conducted at the Stockton Complex. The Stockton Complex (armory, organizational maintenance shop, combined support maintenance shop, and Army aviation support facility) of the California Army National Guard (CANG) was constructed in phases from the 1950s through the 1980s. The site is situated on a 55-acre parcel for all assigned units and operations. Buildings and infrastructure have undergone minimal retrofit or renovations, which is consistent with other Guard facilities across the State.

2.0 LIGHTING AUDIT AND RECOMMENDATIONS – CNG STOCKTON COMPLEX

CLTC staff conducted two site visits to the CNG Stockton Complex during 2010. Both visits consisted of facility tours and discussions with site personnel to identify and quantify baseline lighting technologies, energy use, and operating and maintenance schedules. Following these visits, CNG provided project staff with several sets of lighting plans for buildings at the Stockton Complex. From these plans, CLTC developed a portfolio of simple, energy-efficient lighting retrofit measures that could be replicated statewide. In some areas, minor lighting-efficiency retrofit projects had been completed but were undocumented. Therefore, alternates are available based on documented, as well as observed, lighting baselines. The following measures should be used as a starting point for forthcoming lighting energy-efficiency projects at the CNG. Future measures and associated energy and cost savings may be expanded from these initial concepts.

2.1 SUSPENDED HIGH BAY LUMINAIRES

The California National Guard is home to multiple aircraft support facilities. Facilities at the Stockton complex include one primary hangar, the Army Aviation Support Facility (AASF), which serves as a primary work area for aircraft and vehicle maintenance. A smaller hangar area located at the combined support maintenance shop (CSMS) has been converted into a gymnasium. Lighting for these areas is representative of similar facilities throughout the state. Primary lighting consists of suspended HID high bay luminaires, which operate continuously, regardless of occupancy or available daylight.
2.1.1 EXISTING CONDITIONS

Incumbent high bay luminaires consist of 400 watt (W) metal halide (MH) fixtures in the main hangar bay of the AASF facility, and 250W high pressure sodium (HPS) luminaires in the work bay of the CSMS facility. The total system wattage for the MH fixtures is 458W, and 295W for the HPS fixtures. Both types of luminaires use magnetic ballasts and are pendant mounted. Forty-eight of the MH fixtures are installed in the main hangar bay, and 45 HPS luminaires are installed in the work bay.

Photometric models indicate these spaces are well lit, with an average horizontal illuminance of 47 footcandles (fc) at floor level. Other illuminance metrics can be found in Table 1. Appendix A contains photometric models of existing and proposed lighting for the AASF hangar.

Table 1: Illuminance metrics for the incumbent lighting system in the main hangar of the AASF facility.

<table>
<thead>
<tr>
<th>Space</th>
<th>Average</th>
<th>Max</th>
<th>Min</th>
<th>Uniformity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Hangar Floor</td>
<td>46.93</td>
<td>54.1</td>
<td>26.9</td>
<td>1.74</td>
</tr>
</tbody>
</table>

2.1.2 RECOMMENDED RETROFIT

The recommended replacements for these luminaires consist of fluorescent high bay luminaires coupled with tubular daylighting devices, where appropriate. The CSMS work bay retrofit would consist of one-to-one replacements of existing HID high bays with fluorescent high bay luminaires. These fixtures use four 4’ T8 lamps per luminaire, powered by two energy-efficient electronic ballasts with a ballast factor (BF) of 0.88. Each luminaire consumes 126 W.
The lighting system recommended for the main hangar of the AASF consists of a combination of high bay fluorescent luminaires and tubular daylighting devices (TDD) manufactured by Orion Lighting. This combination of photo-controlled luminaires and TDDs provides the maximum amount of energy-free sunlight while also providing high bay fluorescent lighting to supplement cloudy days and evenings.

By replacing the existing luminaires with the recommended T5HO luminaires, CLTC was able to model the hangar during night hours by negating the contribution of the TDDs. Compared to the incumbent lighting system, the average illuminance was reduced by approximately 7 fc; however, the minimum illuminance stayed the same and the uniformity ratio was reduced. This lighting reduction would reduce overhead glare. Table 2 outlines the various illuminance metrics and compares the incumbent lighting system with the proposed lighting system.

Table 2: Illuminance metrics comparing the existing lighting system and the proposed lighting system in the main hangar during night hours.

<table>
<thead>
<tr>
<th>Lighting System</th>
<th>Average</th>
<th>Max</th>
<th>Min</th>
<th>Uniformity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incumbent</td>
<td>46.93</td>
<td>54.1</td>
<td>26.9</td>
<td>1.74</td>
</tr>
<tr>
<td>Retrofit</td>
<td>39.31</td>
<td>45</td>
<td>26.9</td>
<td>1.46</td>
</tr>
</tbody>
</table>

2.2 RECESSED AND SUSPENDED TROFFER LUMINAIRES

Recessed and suspended fluorescent troffer luminaires are located throughout the base. These luminaires are used in offices and most secondary support areas such as corridors, break rooms, and storage rooms. Many lamp burnouts were observed, as well as various color temperature lamps. Fluorescent troffers serve as one of the main luminaires used in office spaces with drop ceilings and as such a representative of office spaces at all National Guard bases. Luminaires consist of a combination of T8 and T12 linear fluorescent units due to undocumented retrofits of the energy inefficient T12 luminaires. These undocumented retrofits are represented in the lighting audit and recommendations as the alternative luminaire type.

2.2.1 EXISTING CONDITIONS

Incumbent recessed fluorescent luminaires are located throughout the base. These luminaires use either T12 lamps and magnetic rapid-start ballasts or T8 instant-start ballasts with a 0.88 BF. These troffers use two to four lamps depending on setup and location. Sixty-one recessed troffers are located throughout the building.
Table 3 outlines the various wattage and lamping combinations of recessed troffers throughout the CSMS and AASF.

<table>
<thead>
<tr>
<th>Lamp Type</th>
<th>Lamp Qty</th>
<th>Lamp Size (W)</th>
<th>Ballast Type</th>
<th>Ballast Qty</th>
<th>Ballast Input Wattage</th>
<th>Power per luminaire (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T12 fluorescent</td>
<td>4</td>
<td>40</td>
<td>Magnetic T12 rapid start</td>
<td>2</td>
<td>89</td>
<td>178</td>
</tr>
<tr>
<td>T8 fluorescent</td>
<td>3</td>
<td>32</td>
<td>Electronic T8 instant start, 0.88BF</td>
<td>1</td>
<td>86</td>
<td>86</td>
</tr>
<tr>
<td>T12 fluorescent</td>
<td>2</td>
<td>40</td>
<td>Magnetic T12 rapid start</td>
<td>1</td>
<td>89</td>
<td>89</td>
</tr>
<tr>
<td>T8 fluorescent</td>
<td>2</td>
<td>32</td>
<td>Electronic T8 instant start, 0.88BF</td>
<td>1</td>
<td>59</td>
<td>59</td>
</tr>
</tbody>
</table>

2.2.2 RECOMMENDED RETROFIT

Retrofit recommendations consist of a one-to-one replacement of all existing recessed troffers with Lithonia 2VT volumetric troffers. These replacement luminaires use either one or two T5 lamps depending on the luminaire they are replacing. Two-lamp 2VT luminaires consume 62W, while one-lamp luminaires consume 30W. 2VT luminaires use Osram Sylvania ballasts with a 1.0 BF.
2.3 FLUORESCENT 1X4 STRIP LUMINAIRE

Fluorescent strip fixtures can be found throughout the Stockton facility. They were observed mostly in industrial related spaces where additional illuminance was required. Strip luminaires consist of a mix of T12 and T8 linear fluorescent units using either 4’ or 8’ lamps. This mix of T12 and T8 luminaires is represented in the lighting audit and recommendations by the alternate luminaire type. As with the recessed and suspended troffer luminaires, CLTC observed many lamp burnouts and a mix of multiple color temperature lamps. Luminaires are controlled by wall switch and as such operate regardless of occupancy and or light levels. Strip luminaires are often used in locations where the original lighting for a space is not sufficient, and thus represent a regularly observed luminaire in older military and civilian buildings and facilities across California.

2.3.1 EXISTING CONDITIONS

Incumbent strip fixtures are located throughout the CSMS and AASF facilities. These luminaires use either T8 or T12 lamps and corresponding electronic ballasts with BFs of 0.88 or magnetic ballasts. Strip fixtures are surface mounted or pendant mounted and uses one- and two-lamp configurations. One-lamp T12 strip-mounted luminaires consume 45W of power, while two-lamp configurations consume 89W. One-lamp T8 strip-mounted luminaires consume 30W of power, while two-lamp configurations consume 59W.
Figure 4: Two-lamp T12 incumbent strip fixtures in the CSMS facility.

2.3.2 RECOMMENDED RETROFIT

Luminaires that already have been retrofitted to T8s require no further retrofit. Recommended replacements for existing T12 strip fixtures consist of Lithonia MS5 and MS5 R general-purpose strip fixtures that use T5 and T5HO lamps. The recommended luminaires are one-lamp T5 systems that use Osram Sylvania ballasts with a 1.0 BF. The MS5 has no reflector, while the MS5 R does. The product consumes 30W.

Figure 5: The MS5 R (left) and MS5 (right). Photos are courtesy of Lithonia.com.

2.4 WALL PACKS

Wall packs are located on the exterior of the CSMS building façade. The wall packs operate in evenings regardless of occupancy and make use of HPS lamps. Wall packs are used to provide lighting around the exterior for way finding, and as such serve as a great technology to make use of occupancy sensors. Low occupancy rates make exterior way finding lighting an efficient use of funds for maximum energy savings. Additionally, exterior lighting is existent on almost all military buildings and as such provides an avenue for energy savings on all facilities and military installations.

2.4.1 EXISTING CONDITION

Existing wall packs are on the exterior of the CSMS building. They consist of 70W HPS and 400W HPS fixtures that consume 91W and 464W respectively. Three 70W HPS luminaires are mounted at 8’, while seven 400W luminaires are mounted at 20’.

2.4.2 RECOMMENDED RETROFIT

The recommended retrofit for the 70W HPS luminaires on the CSMS building exterior is a bi-level CFL wall pack by RAB lighting. This luminaire senses occupancy via a passive infrared (PIR) sensor and provides 100% of its light. However, when the space around the wall pack is not occupied, it reduces output and saves electricity. The luminaire consumes 42W in high mode and is a full-cutoff fixture to prevent light pollution.

The recommended retrofit for the 400W HPS luminaires is a 250W pulse-start MH luminaire manufactured by Daybrite. This luminaire also is full cutoff and consumes 288W of power.
3.0 ENERGY SAVINGS

After the lighting audit, CLTC recommended lighting products and systems that would simultaneously meet lighting standards and provide energy savings. When applied across both the CSMS and AASF facilities, these retrofits will provide a demand savings of approximately 46 kW. This is a savings of more than 48% when compared with the incumbent lighting systems. These energy savings do not include savings from occupancy-sensing luminaires and daylighting luminaires. As a result, total energy savings actually will be more comprehensive than the energy savings outlined by this project.

Table 4: Retrofit Demand Savings.

<table>
<thead>
<tr>
<th>Lighting Scenario</th>
<th>Energy Demand (kW)</th>
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<tbody>
<tr>
<td>Incumbent</td>
<td>96.86</td>
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<tr>
<td>Retrofit</td>
<td>50.79</td>
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<tr>
<td>Savings</td>
<td>46.07</td>
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</table>

Figure 6: Daybrite wall pack (left) and RAB lighting wall pack (right). Photos are courtesy of Daybrite.com and RABweb.com.
### Table 4.0 ATTACHMENT A - PHOTOMETRIC MODELS

<table>
<thead>
<tr>
<th>Location</th>
<th>Measurement</th>
<th>Lumens</th>
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<tbody>
<tr>
<td>Main Hangar</td>
<td>Interior</td>
<td>3000</td>
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**Figure 7:** Photometric Model - AASF Hangar with Existing Lighting.
Figure 8: Photometric model - AASF hangar with new lighting.
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<th>Date</th>
<th>Location</th>
<th>Notes</th>
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<td>1/1</td>
<td>NY</td>
<td>Test 1</td>
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<td>2</td>
<td>2/2</td>
<td>CA</td>
<td>Test 2</td>
</tr>
<tr>
<td>3</td>
<td>3/3</td>
<td>TX</td>
<td>Test 3</td>
</tr>
</tbody>
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**NATIONAL GUARD AUDIT AND RECOMMENDATIONS**
<table>
<thead>
<tr>
<th>Date</th>
<th>Name</th>
<th>ID</th>
<th>Code</th>
<th>Location</th>
<th>Type</th>
<th>Notes</th>
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<td>456</td>
<td>NY</td>
<td>1234</td>
<td>5678</td>
</tr>
<tr>
<td>2/2/21</td>
<td>Jane</td>
<td>789</td>
<td>012</td>
<td>CA</td>
<td>3456</td>
<td>7890</td>
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<tr>
<td>3/3/21</td>
<td>Mark</td>
<td>321</td>
<td>654</td>
<td>TX</td>
<td>8901</td>
<td>2345</td>
</tr>
</tbody>
</table>

**National Guard Audit and Recommendations**

The table above outlines the key points of the national guard audit and recommendations. Each row details the date, name, ID, code, location, type, and notes. Further analysis and recommendations are provided in the accompanying report.
5.0 ATTACHMENT C – PRODUCT CUT SHEETS

WCL-LARGE CUTOFF WALL PACK
250-400 watt Metal Halide
250-400 watt High Pressure Sodium
250-400 watt Pulse Start Metal Halide

The WCL Large Cutoff Wall Pack offers a sleek design and cutoff performance with a wide range of uses. It delivers the lighting needed for the exteriors of retail buildings, businesses, walkways, underpasses or entrance doors.

ORDERING MATRIX

<table>
<thead>
<tr>
<th>FAMILY</th>
<th>LAMP SOURCE</th>
<th>OPTIONS (add as suffix)</th>
</tr>
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<tbody>
<tr>
<td>WCL</td>
<td>P - Pulse Start Metal Halide</td>
<td>WDF - Winding Double Fase®</td>
</tr>
<tr>
<td></td>
<td>S - High Pressure Sodium</td>
<td>WSF - Winding Single Fase®</td>
</tr>
</tbody>
</table>

VOLTAGE

- 120
- 208
- 240
- 277
- 347
- 480
- 120/277
- 240/277

ACCESSORIES (order separately)
- WO - Wire Guard
- 1R - 11R Replacement Door Assembly
- REC-MT - Photo Control multi-volt
- REC - Photo Control 480 volt

DIMENSIONS

- 141/2" x 12 1/4" x 5 1/2"
- 1 7/8" NPS TAPPED HOLE
- 3/4" NPS TAPPED HOLE
- 5/16" DIAM. K.O. (D)

ENERGY DATA

HIGH PRESSURE SODIUM
- 250 watt-295 watts
- 400 watt-485 watts

METAL HALIDE
- 250 watt-285 watts
- 400 watt-485 watts

PULSE START METAL HALIDE
- 250 watt-288 watts
- 320 watt-368 watts
- 350 watt-400 watts
- 400 watt-460 watts

WEIGHT = 35 lbs. (max.)
FEATURES & SPECIFICATIONS

- INNOVATIVE USE: The VT™ fixture combines the aesthetic and high performance levels of volumetric lighting, with the best value for offices, schools, retail locations and hospitals. Available in one-, two- or three-lamp configurations, and with 2'x4', 2'x8' or 4'x2' sizes, this solution provides the flexibility to design flexibility. Certain adobe materials can diminish longevity of acrylic. Click here for Acrylic Environmental Compatibility table for suitable uses.

- CONSTRUCTION: Rugged, one-piece cold-rolled steel control panel, painted after fabrication with embossed finish (smooth also available, on option).

- Impact-resistant, single clear acrylic diffuser provides excellent shielding and wide distribution.

- End plates include integral T-slot clips.

- Fixture may be mounted and wired in continuous rows.

- Total fixture height is only 4-3/8".

- OPTICS: Volumetric illumination achieved by encasing an optional mix of light with patterns, vertical and horizontal with surfaces — elevating the material space, objects and occupants in a multi-balanced, complementary luminous environment.

- Linear fixture prevents any shadows and discards light into the space without maximum luminous contrast between the fixture and ceiling.

- Shaped end plates provide a smooth, luminous transition between fixture and ceiling while enhancing the perception of fixture depth.

- ELECTRICAL: Highly efficient plug-in-cable electrical connection, Class I electrically insulated, 120V, non-PDB, non-GFCI, CSA certified, seawater tested.

- Laminated is suitable for dry locations. NEMA, T4H or T8H wire used throughout; rated for required temperatures.

- Step-fed driving system allows systems to be switched to 39% power factor compliance. ST options available for use with LITHONIA Lighting's intelligent systems, which control both dimming and lighting.

- Specifications:
  - Length: 48 (1220)
  - Width: 24 (610)
  - Depth: 4-3/8 (110)
  - All dimensions are inches (centimeters).

- INSTALLATION: Includes plug-in-cable electrical connection, mounting to standard 1" and 2-1/8" fixture boxes, or retrofit to existing metal fixtures. (If new box is required.)

- Wall or ceiling adaptors available.

- LUGGING: UL Listed to U.S. and Canadian standards.

- WARRANTY: Limited warranty for one year against chemical defects in manufacture.

- Note: Specifications subject to change without notice.

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**ORDERING INFORMATION**

Lead times will vary depending on options selected. Consult with your sales representative.

**Examples:** VTBR 2 32 AOFMVT GB102S LP935

---

**Table:**

<table>
<thead>
<tr>
<th>Series</th>
<th>Air function</th>
<th>Number of Lamps</th>
<th>Wattage</th>
<th>Diffuser</th>
<th>Voltage</th>
<th>Ballast configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTR5</td>
<td>TS 2x2 volumetric tru-fit</td>
<td>4</td>
<td>1</td>
<td>32</td>
<td>210W</td>
<td>ST4190 (210W)</td>
</tr>
<tr>
<td>VTR8</td>
<td>TS 2x8 volumetric tru-fit</td>
<td>4</td>
<td>2</td>
<td>32</td>
<td>210W</td>
<td>ST4190 (210W)</td>
</tr>
</tbody>
</table>

**Ballast Options:**

- G910R: T-lucifer, <10% THD, instant start
- G910R: T-lucifer, <10% THD, programmed run start
- G910PS: T-lucifer, <10% THD, programmable run start

**Lamp Options:**

- L65: 50W, 4000 Kelvin
- L65: 50W, 4200 Kelvin

**Options:**

- EL: Emergency battery pack, 1400 lumens
- EL: Emergency battery pack
- CSA: Meets Canadian standards

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**Fluorescent:**

- 64/24: T8 fluorescent fixture, mini-socket base
- 2VT4 56: T8 fluorescent fixture, mini-socket base

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**Notes:**

1. Available with 210W and 2410W only.

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**FLUORESCENT**

- **VTBR 20W**
**FEATURES & SPECIFICATIONS**

**IBZ Series**

- **Beam Angle**: 22-32°
- **Wattage Range**: 4-8 lamps
- **Color Temperature**: 4100K
- **Luminous Efficiency**: 87 lumens/watt

**Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>Beam Angle</th>
<th>Wattage</th>
<th>Luminous Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBZ</td>
<td>22-32°</td>
<td>4 lamps</td>
<td>347 lumens/watt</td>
</tr>
<tr>
<td>IBZ</td>
<td>22-32°</td>
<td>6 lamps</td>
<td>513 lumens/watt</td>
</tr>
<tr>
<td>IBZ</td>
<td>22-32°</td>
<td>8 lamps</td>
<td>680 lumens/watt</td>
</tr>
</tbody>
</table>

**Options**

- **Ballast Types**: Electronic, Magnetic
- **Lamp Sizes**: 17W, 34W, 50W, 60W, 80W
- **Protective Coatings**: Clear, Frosted, Prismatic

**Accessories**

- **LED Retrofit Kit**
- **Surface Mounting Bracket**
- **Wiring Gland**
- **Mounting Hardware**

**Notes**

- **Shipping Weight**: 3.6 lbs
- **Shipping Dimensions**: 12" x 12" x 8"
- **Installation Options**: Hardwire, Plug-in, Wireless

**Warranty**

- **Limited Warranty**: 2 years on parts, 5 years on lamps

**Contact Information**

- **Phone**: 1-800-543-5000
- **Email**: info@ibzlighting.com
- **Website**: www.ibzlighting.com
NATIONAL GUARD AUDIT AND RECOMMENDATIONS

FEATURES & SPECIFICATIONS

INTENDED USE
T5 linear direct fluorescent intended for use in low-profile commercial, retail, manufacturing, warehouse, cave and display applications.

ATTRIBUTES
Designed exclusively for use with T5 lamps, T5 sockets and T5 electronic ballasts.

CONSTRUCTION
Housing formed from cold-rolled steel. No asbestos is used in this product. Heavy-duty 20-gauge channel.

Extended-height end caps retain and support sockets. Compact T5 socket feature rotating collar and enclosed contacts.

FINISH
High-gloss, baked white enamel finish. Five-stage iron-phosphate pretreatment ensures superior paint adhesion and rust resistance.

OPTICAL SYSTEM
Reflector options include solid or perforated designs in both symmetric and asymmetric configurations.

ELECTRICAL SYSTEM
Thermally protected, resetting, Class P, HPF, non-PCB, IL Listed.

Suitable for lamp locations. AWM, TPN or THHN wire used throughout, rated for required temperatures.

INSTALLATION
Labor-saving coupler supplied for row mounting. Numerous knockouts for easy installation. Surface-mount or suspended.

LISTING
UL Listed and CSA Certified (see Options).

WARRANTY
Guaranteed for one year against mechanical defects in manufacture. Specifications subject to change without notice.

ORDERING INFORMATION

Example: MS51 54T5HO SMR MVOLT GE11PS

<table>
<thead>
<tr>
<th>Series</th>
<th>Number of lamps</th>
<th>Lamp type</th>
<th>Configuration</th>
<th>Finish</th>
<th>Reflector type</th>
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<tbody>
<tr>
<td>MS5</td>
<td>1, 2</td>
<td>14T5</td>
<td>14W T5 (22&quot;)</td>
<td>ASMR</td>
<td>SARB</td>
</tr>
<tr>
<td></td>
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<td>14T6</td>
<td>14W T6 (22&quot;)</td>
<td>SMR</td>
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<td>54T5SHO</td>
<td>54W T5 HO (40&quot;)</td>
<td>SARB</td>
<td>Calibrated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>54T6</td>
<td>54W T6 (40&quot;)</td>
<td>SMR</td>
<td>Calibrated</td>
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</tbody>
</table>

Options

GE11PS Electronic ballast, <1% THD, Program Start
GLR Internal fast-blow fuse
GMF Internal slow-blow fuse
PLF Plug-in fuse, 1 or 2 branch circuits and hot wires (A-black, B-red, C-blue, AB or AC)
FLBG Emergency battery pack (300-700 lumens; see Fluorescent Battery Packs tab)
NATIONAL GUARD AUDIT AND RECOMMENDATIONS

WP2CF42MS

DESCRIPTION
Sensor controlled WP2 Walljack in 42 watt CFL cutoff & 84 watt CFL refractor models. Starting temperature 0°F-18°C. Sensor has 180º detection and controls up to 250 watts. 120 volts only. Lamp supplied.

SPECIFICATIONS
"No Hands" Auto Testing:
Auto mode starts after 4 minutes of testing. No adjustment needed.
Built for Severe Conditions:
Double weatherproofing for long life
LED Detection Indicator:
Glows red day and right for "on-guard" deterrence.
Manual Override:
Double flip wall switch logic prevents activation by short power outages. Resets after 8 hours. No extra wiring needed.
Photocontrol:
Deactivates lights during daylight. Fully adjustable for 24 hour operation or custom applications. Please specify voltage.
Quick Test Time:
5 seconds test time for fast installation. Works day or night.
Sensor Case Construction:
Precision molded Lexan®
Surge Protection:
Withstands up to 3000 volts
UL Listing:
Suitable for wet locations.

Time Adjustment:
5 seconds to 15 minutes CFL lamps have longer life if Time Adjustment is set to > 7 minutes.

Vandal Resistant Lens:
Hard lens resists vandalism
Voltage:
120 volts AC 60 Hz
Ballast Minimum Starting Temperature:
-22°F
Detection:
180º detection
Minimum Starting Temperature:
0°F
Patents:
RAB sensor and fixture designs are protected under U.S. and International intellectual Property laws.

Switching Capacity:
Controls up to 250 watts Fluorescent @ 120 volts

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Compact Fluorescent Lamp supplied with fixture</th>
<th>Total Watts</th>
<th>Lamp Type</th>
<th>Lamp Size</th>
<th>Ballast</th>
<th>Starting Amps</th>
<th>Operating Amps</th>
<th>Input Watts</th>
<th>LAMP ANSI</th>
<th>Initial Lumens</th>
<th>Lamp Hours</th>
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<tbody>
<tr>
<td>42</td>
<td>42W</td>
<td>G24q-4</td>
<td>Elect. PF QT</td>
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<td>0.3</td>
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<td>46</td>
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</table>

Factory Installed Options
Add suffix to Catalog Number

Note: Specifications may change without notice

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NATIONAL GUARD AUDIT AND RECOMMENDATIONS

2', 3', OR 4' STAIRWELL LUMINAIRE

APPLICATION
- Surface mount luminaire with integral motion sensor to create an optimum combination of energy savings and safety.
- Enhances security by providing a visual indication of occupancy.
- Designed for use in applications with variable or minimal occupancy, such as stairwells, storage areas, and restrooms.
- Electronic dimming ballast operates in full dimmed (5% light level) mode until occupancy is detected, then automatically switches to full bright.
- Dimming ballast saves energy while providing illumination at all times for safety.
- Available for ceiling or wall installations.
- 2', 3', and 4' models available for application flexibility.
- Consult local code authority for applications where Stairwell luminaire will be used as emergency lighting. Wall mount configurations require 1/2" on floor in emergency mode.

CONSTRUCTION/FINISH
- Housing is multi-stage phosphate treated for maximum corrosion resistance and finish coat is high reflectance baked white enamel.
- Steel housing and end caps provide added durability.
- End caps are fixed for extra lens protection.
- Ultrasonic sensor is factory installed at the end of the luminaire.

CATALOG NUMBER

<table>
<thead>
<tr>
<th>STW</th>
<th>NO. OF LAMPS</th>
<th>LAMP</th>
<th>BALLAST</th>
</tr>
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<tbody>
<tr>
<td>STW - Stairwell</td>
<td>1 or 2</td>
<td>T8</td>
<td>1/2 - EB</td>
</tr>
</tbody>
</table>

- Multiple knockouts are provided on the rear of the housing to accommodate a variety of mounting methods.

ELECTRICAL
- Class P, HF ballasts comply with Federal Ballast Law (Public Law 100-357, 1988).
- Dimming delay is factory adjusted to approximately 8 minutes, can be field adjusted up to 100 minutes.
- Ovoll operation (OFF option) is available for areas where illumination is not required at all times.
- Wall models include a 180° sensor; ceiling models incorporate a 360° sensor.
- UL listed for damp location.
- Self-contained fluorescent emergency power packs can be incorporated. UL listed for dry locations.

ENCLOSURES
- Choice of clear prismatic (CP) or smooth white opal (WO) lenses. Vandal resistant lenses are .125" nominal thickness hi-impact acrylic.
- Available internal reflector (REF option) directs more light downward for applications requiring less uplight or when additional direct light is needed to meet minimum illumination requirements.
- Wireguard (WG) option provides added protection for the lens.
- Tamper resistant (TR) option prevents the lens from being removed by unauthorized personnel. Tamper proof driver (cat. #1PDU1H) required (sold separately).

JOB INFORMATION

740.1-SA